

## REMARKS

The official action of 29 September 2009 has been carefully considered and reconsideration of the application as amended is respectfully requested.

Claim 1 has been amended in accordance with the disclosure in the specification as filed at, for example, page 5, first full paragraph (last line of paragraph), and Example 1 on page 15. New claims 33-35 have been added more completely to define the subject matter which Applicants regard as their invention. Support for the recitations in these new claims appears in the Examples in the specification, as discussed below.

The claims stand rejected under 35 USC 103(a) as allegedly being unpatentable over a combination of four (4) references: Kwantes et al, Taylor et al, Hachiya et al and Okamoto et al. Applicants respectfully traverse this rejection.

The claimed invention is based at least in part upon Applicants' discovery that, if a rectification zone with water removing capacity is used to obtain a water depleted fraction primarily containing phenol and bisphenol A and having **a water content controlled at a level of not greater than 2% by weight**, and if the water depleted fraction is withdrawn **in liquid** and recycled into the reaction zone, the feedstocks of phenol and acetone can be converted into bisphenol A to the greatest possible extent while the negative effects caused by the presence of large amounts of water in the reaction zone are diminished.

The Examiner has cited four (4) references in support of the contention that the claimed invention would have been obvious, but Applicants respectfully submit that the cited references are incapable of setting forth even a *prima facie* case of obviousness for the invention as now claimed. In this respect, the rationale articulated by the Examiner to support the alleged *prima facie* case is that Okamoto et al allegedly provide a motivation that would have led one of ordinary skill to combine the reference teachings to arrive at the claimed invention (see official action at paragraph bridging pages 5-6). However, as next discussed, Okamoto et al only provide a motivation to remove water simultaneously or alternatively with

the reaction of phenol and acetone in a reaction zone and **teach away** from the recycling of reaction products to the reaction zone.

Okamoto et al discloses a method for preparing bisphenol A comprising reacting acetone and phenol in the presence of a catalyst wherein the reaction of acetone and phenol is performed while removing a part of the water generated during the reaction from the mixed solution containing acetone and phenol by a pervaporation method. The bisphenol A produced can be recovered by a known method such as removal of phenol by crystallization. In the method disclosed in Okamoto, the pervaporation method for removing the water generated during the reaction is performed by use of a separating membrane selective toward water which is selected from inorganic porous membranes, organic polymer-membranes and/or inorganic-organic composite membranes (see Okamoto in the paragraph bridging columns 3-4). Thus its capacity for removing water is limited. (The present specification discusses this drawback at page 3, paragraph 4).

Significantly, in addition to teaching that the water generated in the reaction for preparing bisphenol A should be removed simultaneously or alternatively (Okamoto at column 4, lines 42-43), Okamoto also **teaches away** from methods (such as taught in the primary reference cited herein) which recycle reactant products back to the reaction zone (see Okamoto at, e.g., column 2, line 67- column 3, line 10). In other words, the motivation provided by Okamoto is only to remove water simultaneously or alternatively with a reaction in the reaction zone and **not** to modify prior art processes that recycle reactants back to the reaction zone.

In view of the above, Okamoto cannot be used to provide a motivation to combine the references for at least this reason. See MPEP 2145(X)(D)(2) (“It is improper to combine references where the references teach away from their combination.”). Moreover, as next discussed, a motivation to combine the references is lacking for other reasons as well.

Taylor relates to recovery of phenols by distillation. More specifically, as disclosed in the Taylor specification at column 1 lines 10-18, a crude phenol containing

substantial amounts of water is passed to a dehydration rectification zone to withdraw an overhead fraction which is substantially an azeotropic mixture of water and phenol and a bottom fraction which is substantially anhydrous crude phenol, which is subsequently passed to a rectifying zone and separated into pure phenol and a bottom fraction. It can be appreciated that the disclosed process is for purifying crude phenol to obtain pure phenol; **not** for processing the reaction product of phenol and acetone, which comprises phenol, acetone, bisphenol A and water. There is nothing in Taylor or in the prior art as a whole to suggest using the Taylor process to obtain a **bisphenol A product** and a water-depleted fraction in liquid with water content of not greater than 2wt% to be recycled to a reaction zone. Claim 1 pertains to a reaction and stream that is different from and more complicated than that taught by Taylor et al.

Similarly, Hachiya relates to a method for producing aromatic polycarbonate, wherein phenol is by-produced and then recovered as a crude phenol product to be utilized as such, i.e. without any purification or the like, for producing aromatic polycarbonate (Hachiya specification at column 1 lines 6-24). There is nothing in Hachiya et al or in the prior art as a whole that would show or suggest using the Hachiya process to obtain a bisphenol A product.

For the above reasons, Applicants respectfully submit that, in the absence of the hindsight provided by the present specification, there could have been no motivation or reason to modify or combine the cited references to arrive at the claimed invention. Accordingly, Applicants respectfully submit that the references are incompetent to set forth even a *prima facie* case of obviousness for the invention as claimed.

Even assuming for the sake of argument that the cited references were competent to set forth a *prima facie* case of obviousness, Applicants respectfully submit that the evidence of record in the specification would be sufficient to rebut any such *prima facie* case. In this respect, in addition to reducing the negative effects caused by the presence of large amounts of water in the claimed reaction (by reducing the amount of water so as to facilitate a continuation of the reaction and by using the recycled water to remove heat generated in the reaction zone- -see specification at page 3, paragraph 1 and page 5, paragraph

2), the Examples in the specification show that the claimed process is unexpectedly superior in the conversion of acetone and in the selectivity of the reaction as compared to the processes of the Comparative Examples, which are substantially identical with the actual Examples with the exception that, in the Comparative Examples, the recycled stream is not dewatered prior to recycling.

More specifically, as demonstrated by the evidence in the specification, the conversion of acetone in the Examples is 86%, 87%, 87%, 87.5% and 88%, and the selectivity of reaction is 95.5%, 94%%, 96.5%, 95% and 96% (Examples 1, 2, 3, 4 and 5) respectively. In contrast in the comparative examples, the conversion of acetone is 81% and 85%, and the selectivity of the reaction is 90% and 91% (Comparative Examples 1 and 2) respectively. With respect to the results, one of skill in the art would appreciate that, in the chemical engineering industry, an improvement of even one (1) percent is significant and probative of nonobviousness.

Applicants respectfully note that the comparison provided in the specification is with respect to processes that are closer to the claimed invention than the process described in the closest prior art reference, as represented by the cited primary reference Kwantes. See MPEP 716.02(e)(1) (“Applicants may compare the claimed invention with prior art that is more closely related to the invention than the prior art relied upon by the examiner.”). In contrast, in Kwantes et al. the highest acetone conversion in Examples 2-4 are 54%, 58% and 52, i.e., much lower than that achieved by the specification Examples wherein the lowest conversation of acetone is of 86% (Example 1).

In view of the above, Applicants respectfully submit that the prior art rejection of record have been overcome and should be withdrawn, and that the application is now in allowable form. An early notice of allowance is earnestly solicited and is believed to be fully warranted.

Respectfully submitted,

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